

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13  
NATIONAL DAM SAFETY PROGRAM, CITY OF UTICA RESERVOIR 5 (INVENTO--ETC(U)  
AUG 80 J B STETSON DACW51-79-C-0001

NL

1 of 1  
 11-7-23

END  
DATE  
FILMED  
81-1-  
DTIC

AD A091703

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A091703	703
4. TITLE (and Subtitle) Phase I Inspection Report City of Utica Reservoir No. 5 Mohawk River Basin, Oneida County, NY Inventory No. 199		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s)  John B. Stetson		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale Engineering Company Banker Trust Building Utica, NY 13501		8. CONTRACT OR GRANT NUMBER(s)  DACW-51-79-C-0001
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, NY 12233		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287		12. REPORT DATE 26 September 1980
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report)  UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES  Original contains color plates: All DTIC reproductions will be in black and white		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability  Oneida County City of Utica Reservoir No. 5		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.  The Phase I inspection of the City of Utica Reservoir 5 did not indicate conditions which would constitute an immediate hazard to human life or property.		

DDC FILE COPY

The hydrologic/hydraulic analysis indicates that the impoundment will contain the runoff from the PMF without overtopping of the structure. Therefore, the spillway is assessed as adequate.

The following remedial work should be undertaken during normal maintenance operations within one year:

1. Woodchuck and/or muskrat burrows should be filled in and the rodents eliminated from the facility.
2. Remove brush and trees from the diversion ditch.
3. A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam.
4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility.

MOHAWK RIVER BASIN

CITY OF UTICA RESERVOIR 5  
ONEIDA COUNTY  
NEW YORK

INVENTORY NO NY 199

(12) 601

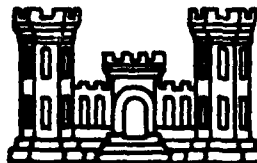
(10) John E. Stetson

(6) PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM.

City of Utica Reservoir 5 (Inventory Number NY 199)  
Mohawk River Basin, Oneida County, New York.  
Phase I Inspection Report

APPROVED FOR PUBLIC RELEASE;  
DISTRIBUTION UNLIMITED  
CONTRACT NO. DACW 51-79-G0001

(11) Aug 80



NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1980

80 10 31 038

393970

## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

Accession For	
NTIS CPA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/ _____	
Availability Codes	
Avail and/or	
Dist	Special
A	

## TABLE OF CONTENTS

	<u>Page</u>
Preface	i
Assessment of General Conditions	ii-iv
Overall View of Dam	1-4
Section 1 - Project Information	5
Section 2 - Engineering Data	6
Section 3 - Visual Inspection	7
Section 4 - Operational Procedures	8-9
Section 5 - Hydrologic/Hydraulic Computations	10
Section 6 - Structural Stability	11-12
Section 7 - Assessment/Remedial Measures	

## FIGURES

- Figure 1 - Location Map
- Figure 2 - Plan and Topographic Map
- Figure 3 - Piping Plan for Reservoirs Nos. 2 and 5
- Figure 4 - Aerial Photograph of Reservoirs Nos. 2, 4 and 5

## APPENDIX

Field Inspection Report	A
Previous Inspection Report/Relevant Correspondence	B
Hydrologic and Hydraulic Computations	C
References	D

PHASE I REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam City of Utica Reservoir 5 NY199

State Located New York  
County Located Oneida  
Stream Not Applicable  
Date of Inspection July 23, 1980

ASSESSMENT OF  
GENERAL CONDITIONS

The Phase I inspection of the City of Utica Reservoir 5 did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the impoundment will contain the runoff from the PMF without overtopping of the structure. Therefore, the spillway is assessed as adequate.

The following remedial work should be undertaken during normal maintenance operations within one year:

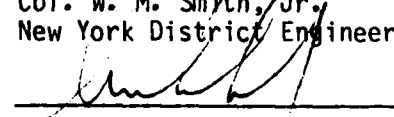
1. Woodchuck and/or muskrat burrows should be filled in and the rodents eliminated from the facility.
2. Remove brush and trees from the diversion ditch.
3. A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam.
4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility.

Dale Engineering Company

  
John B. Stetson, President

26 SEP 1980

Approved By:  
Date:

Col. W. M. Smith, Jr.  
New York District Engineer  




1. View of Reservoir No. 5 looking east





5. View of westerly  
embankment of Reservoir  
5 facing north.



6. View of easterly  
embankment of  
Reservoir 5 facing  
south.



7. View of northerly  
embankment of  
Reservoir 5 facing  
east.



2. Westerly embankment  
of Reservoir 5.  
(Reservoir 2 in fore-  
ground)



3. Outlet of Reservoir #5.



4. Discharge of  
reservoir outlet.

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
NAME OF DAM - CITY OF UTICA RESERVOIR 5 ID# - NY 199

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the City of Utica Reservoir 5 and appurtenant structures, owned by the City of Utica Board of Water Supply, Utica, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The City of Utica Reservoir 5 is located in the Town of New Hartford immediately adjacent to the City of Utica boundary. The reservoir is part of a system of three reservoirs which presently provide a source of emergency water supply to the City of Utica. The dam consists of an earthen embankment approximately 2640 feet long with a maximum height of approximately 34 feet. A 20 inch diameter discharge pipe is situated in the Southeast corner of the reservoir. This pipe discharges into a drainage channel which collects drainage from the south and east of the site.

b. Location

The City of Utica Reservoir 5 is located in the Town of New Hartford, Oneida County, New York.

c. Size Classification

The maximum height of the dam is approximately 34 feet. The volume of the impoundment is approximately 576 acre feet. Therefore, the dam is in the Small Size Classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The impoundment is located immediately adjacent to a heavily developed residential section of the City of Utica. Therefore, the dam is in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the City of Utica Board of Water Supply, Utica, New York.

Contact: General Manager  
Utica Board of Water Supply  
City Hall  
1 Kennedy Plaza  
Utica, New York 13502  
Telephone: 315-798-3310

f. Purpose of the Dam

The dam is used as a water supply reservoir for the City of Utica. At the present time, the dam is used only as an emergency supply and is not directly connected into the water system of the City of Utica.

g. Design and Construction History

The reservoir was constructed in 1896 and was the last of the three reservoirs on the site. Very little appears to have changed from the original construction. Plans for Reservoir No. 5 dated January, 1896, substantially conform to the present configuration.

h. Normal Operational Procedures

At the present time water level in the impoundment is maintained only by the rainfall which enters the impoundment by falling on the water surface or the slopes immediately adjacent thereto. This reservoir has not been used as a part of the public water supply since the drought of 1964 when it was used to supplement the city supply.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the reservoir is approximately 36.5 acres.

b. Discharge at Dam Site

Discharge at the overflow pipe is related only to rainfall which occurs at the site.

c. Elevation (Feet Above MSL)

Top of Dam	621.0+ (low spot at Southwest corner)
Normal Pool	618.5

d. Reservoir

Length of Normal Pool (maximum) 1,500 feet±

e. Storage

Normal Pool	576 Acre Feet
	187,796,000 Gallons

f. Reservoir Area

Normal Pool	23 Acres
-------------	----------

g. Dam

Type - Earth Fill.  
Length - 2640 feet.  
Height - Varies, 34 Feet maximum.  
Freeboard - 2.5 minimum.  
Top Width - 20 Feet.  
Side Slopes - 2 Horizontal:1 Vertical  
Zoning - Select material upstream, puddle core, common material downstream.  
Impervious Core - Puddle Wall.  
Grout Curtain - None.

h. Spillway

Type - 20 inch diameter pipe.  
Elevation - 618.5<sub>+</sub>

i. Reservoir Drain

12 inch valved drain pipe to channel at toe of northerly embankment.

## SECTION 2 - ENGINEERING DATA

### 2.1 GEOTECHNICAL DATA

#### a. Geology

The dam is located near the base of the northern slope of the Appalachian Plateau Province, in the Mohawk section of that Province. The area had been subjected to glacial activity and is underlain by shaley black claystones of the Utica Shale formation of Upper Ordovician age. The dam is probably sited on glacial material which overlies finely laminated shale claystone. Bedding is close to horizontal in the area, with a gentle dip of less than 1° to the south. Jointing is present in the shale and shows two prevalent directions, N20°E and N65°E. Glacial cover is apparently of stratified sand and gravel and may represent a deltaic terrace of deposition. Depth of this glaciolacustrine debris may vary from a thin veneer to no more than a few tens of feet.

#### b. Subsurface investigations

No subsurface information was available concerning the foundation of the original embankment.

### 2.2 DESIGN RECORDS

No reports were available from the original design of the dam. Available plans are included as Figures 2 and 3.

### 2.3 CONSTRUCTION RECORDS

No information was available concerning the original construction.

### 2.4 OPERATIONAL RECORDS

There are no operation records available for this dam.

### 2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files and from the City of Utica Board of Water Supply. The information available appears to be reliable and adequate for a Phase I inspection report.

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

#### a. General

The City of Utica Reservoir 5 was inspected on July 23, 1980. The Dale Engineering Company Inspection Team was accompanied on the inspection by Russell S. LoGalbo, Principal Engineer for the City of Utica Board of Water Supply.

#### b. Dam

At the time of the inspection, the water level in the impoundment was approximately 1/2 inch above the invert of the outlet pipe. The slopes of the earthen dike were uniform and no evidence of displacement was detected. Some woodchuck burrows were found on the downstream face of the earthen dike. These burrows had been marked by maintenance personnel. Mr. LoGalbo indicated that the Board of Water Supply was considering a program for elimination of the woodchucks.

#### c. Appurtenant Structures

There are no structures appurtenant to this facility.

#### d. Control Outlet

The outlet of the impoundment consists of a 20 inch diameter clay pipe. This pipe is in operating condition at the present time.

#### e. Reservoir Area

The reservoir area covers approximately 23 acres. Minor sloughing has occurred at the water line in some areas. The configuration of these areas suggests the possibility of muskrat burrows having existed at one time.

#### f. Downstream Channel

The downstream channel shows minor signs of erosion.

### 3.2 EVALUATION

The visual inspection revealed that the embankment is generally in good condition. Woodchuck holes were detected on the downstream face of the embankment and localized sloughing at the waterline is suggestive of the existence of muskrat burrows. Appropriate steps should be taken to eliminate woodchucks and muskrats from the embankment.



## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

This reservoir is used only as an emergency source of water for the City of Utica Water Supply system. At the present time, the valves controlling flow from the reservoir are fully closed. No use has been made of this facility for approximately 16 years. Water level in the impoundment varies with rainfall throughout the year.

### 4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the City of Utica Board of Water Supply. Periodic visits are made to the site to check on conditions of the facilities. No formal operating system is in effect at this site.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

The valves controlling flow into the impoundment have not been operated in many years but are believed to be in operating condition.

### 4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

### 4.5 EVALUATION

The dam and appurtenances are normally inspected by representatives of the Utica Board of Water Supply. The facility is presently in good condition and adequately maintained. Since this dam is in the high hazard classification, a warning system should be implemented to alert the public should conditions occur which could result in failure of the dam.

## SECTION 5 - HYDROLOGIC/HYDRAULIC

### 5.1 DRAINAGE AREA CHARACTERISTICS

Utica Reservoir No. 5 is located on the southeast fringe of the City of Utica. The dam has a drainage area of 36.5 acres consisting of a wooded hillside, the reservoir with a surface area of 23 acres, and the berms forming the reservoir's embankment.

### 5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration of run-off of a specific location that is considered reasonably possible for a particular drainage area. The dam is in the Small Dam Category and is a High Hazard.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam and spillway capacity. Unit hydrographs were defined by Snyder coefficients,  $C_t$  and  $C_p$ . Snyder's  $C_t$  was estimated to be 2.0 for the drainage area and  $C_p$  was estimated to be 0.625.

The Probable Maximum Precipitation (PMP) was 19.2 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. The loss rate function yielded 93 percent run-off from the PMF. The peak for the PMF inflow hydrograph was 215 cfs and the 1/2 PMF inflow peak was 108 cfs. The large storage capacity of the reservoir, in relation to the size of the contributing drainage area, reduced these peak flows to 23 cfs for the PMF and 5 cfs for the 1/2 PMF.

### 5.3 SPILLWAY CAPACITY

The spillway is a 20 inch diameter clay pipe. Inlet control was assumed for the spillway rating curve development. The discharge capacity of the spillway at the top of dam elevation is 14 cfs.

### SPILLWAY CAPACITY

<u>Flood</u>	<u>Peak Discharge</u>	<u>Capacity as % of Flood Discharge</u>
PMF	13 cfs	108%
1/2 PMF	5 cfs	280%

It should be noted that in this analysis it was assumed that all of the runoff from the hillside would flow into the reservoir. At the present time, there is a diversion ditch at the toe of this hillside that might divert some of this runoff. However, it was felt that brush and debris in this ditch as well as any lack of maintenance could severely restrict the usefulness of this ditch in diverting this flow, therefore the effect of the ditch was not considered in the analysis.

#### 5.4 RESERVOIR CAPACITY

The reservoir storage capacity was estimated from plans of the reservoir. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam	634 Acre Feet
Spillway Crest	576 Acre Feet

#### 5.5 FLOODS OF RECORD

There is no information on water levels at the dam site.

#### 5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the spillway can pass the PMF with 0.14 feet of freeboard and the 1/2 PMF with 1.26 feet of freeboard.

#### 5.7 EVALUATION

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 0.14 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers screening criteria.

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observations

The City of Utica Reservoir No. 5 is one of a complex of three basins situated just south of the City of Utica, New York. The water level in Reservoir No. 5 is at elevation 618.5+. Reservoir No. 2, situated immediately to the west of Reservoir 5, has a water elevation of 600.6+. Reservoir No. 4, situated to the southwest is at elevation 654.2+. These three reservoirs are used as an emergency source of water for the City of Utica Board of Water Supply system which serves the City of Utica and adjoining communities. All of the slopes of the embankment forming the reservoir are generally in good condition, with no evidence of structural movement or cracking. Some woodchuck burrows were found in the downstream slope of the reservoir. Minor sloughing at the waterline of the impoundment suggests the presence of muskrat burrows. Examination of the slopes of Reservoir No. 5 indicates no seepage occurring through the embankments.

#### b. Seismic Stability

No known faults exist in the area of the reservoir, however, the Preliminary Brittle Structures Map of 1977 does show a lineament to be present about one-third mile north of the reservoir. The only earthquake of significance for the Utica area occurred in 1840 about 12 miles southeast of the reservoir. It had an intensity of V-VII on the Modified Mercalli scale. In 1930 an earthquake of intensity II took place about four miles to the west-northwest. Other minor tremors have occurred on occasion in the general area.

#### c. Data Review and Stability Evaluation

Drawings included in the report substantially conform to the configuration of the facility as presently exists. The drawings indicate the structure was built with a puddle core and a shell of select material on the upstream slope with common material placed on the downstream slope. Both the upstream and downstream slopes were constructed to a slope of 2 horizontal on 1 vertical. Embankments and impounding slopes are in good condition structurally. Grass on the slopes has been mowed and the structure shows evidence of proper maintenance. Woodchuck burrows on the downstream slope and muskrat burrows at the waterline of the impoundment should be eliminated by removal of the rodents and filling of the burrows. On the basis of the visual examination, the earthen embankment of the reservoir appears to be adequate for normal reservoir operation. Properly maintained, the reservoir's earth structures are expected to retain stability for loading conditions comparable to those of the past.

## SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT

#### a. Safety

The Phase I inspection of the City of Utica Reservoir 5 did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the impoundment will contain the runoff from the PMF without overtopping of the structure.

The visual inspection did not reveal conditions which would indicate evidence of structural displacement or instability.

The following specific safety assessments are based on the Phase I Visual Examination and Analysis of Hydrology and Hydraulics:

1. Woodchuck burrows were found to exist on the downstream slopes of the embankment. Localized sloughing at the waterline of the reservoir suggests the presence of muskrat burrows.
2. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.
3. No formalized inspection system is in effect at the facility.

#### b. Adequacy of Information

The information available is adequate for this Phase I investigation.

#### c. Urgency

Items 1 through 3 of the Safety Assessment should be addressed by the owner and appropriate actions taken within one year of this notification.

#### d. Need for Additional Investigation

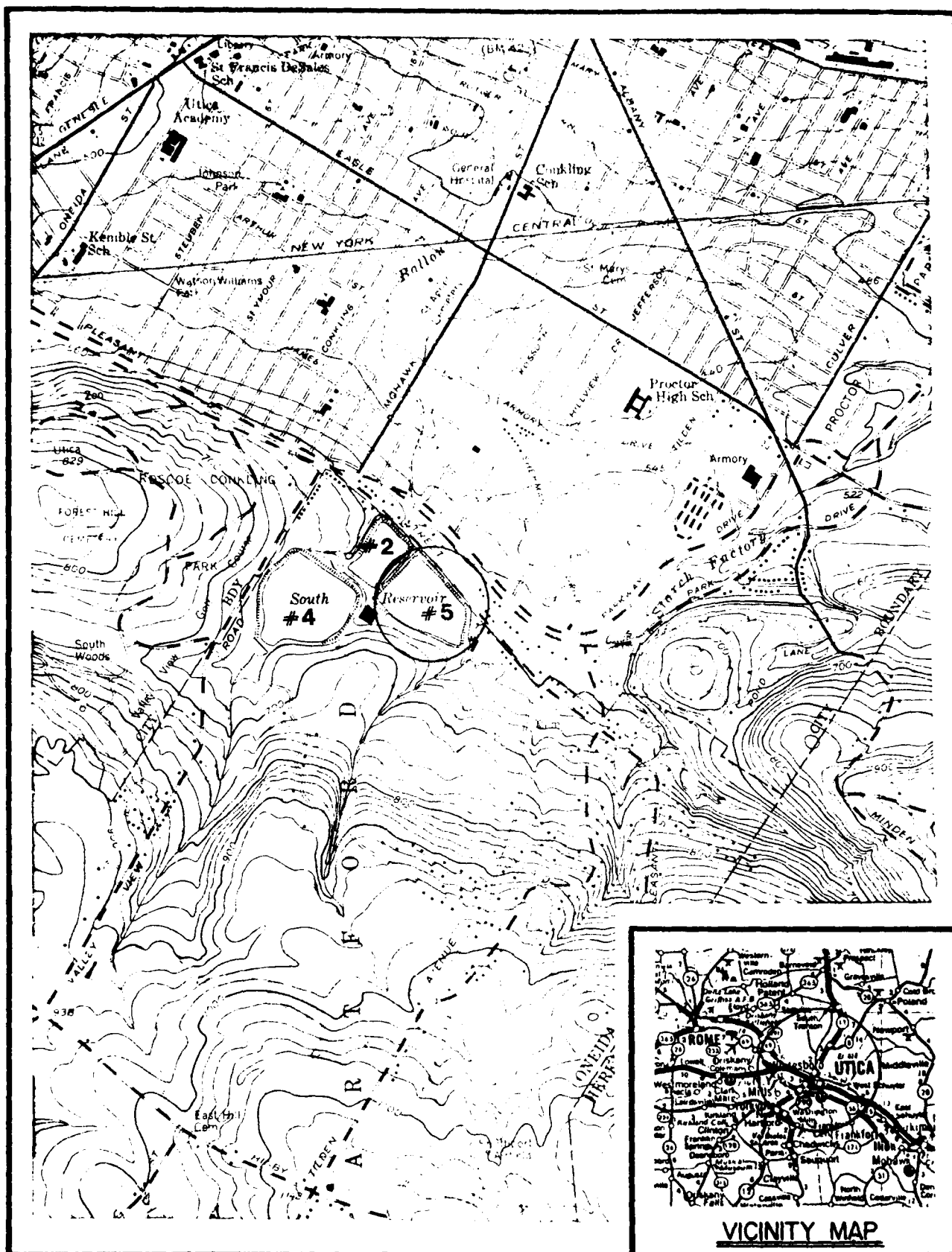
This Phase I inspection has not revealed the need for additional investigations regarding this structure.

### 7.2 RECOMMENDED MEASURES

The following is a list of recommended measures to be undertaken to insure safety of the facility:

1. Woodchuck and/or muskrat burrows should be filled in and the rodents eliminated from the facility.

2. Remove brush and trees from the diversion ditch.
3. A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam.
4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility.



# LOCATION PLAN

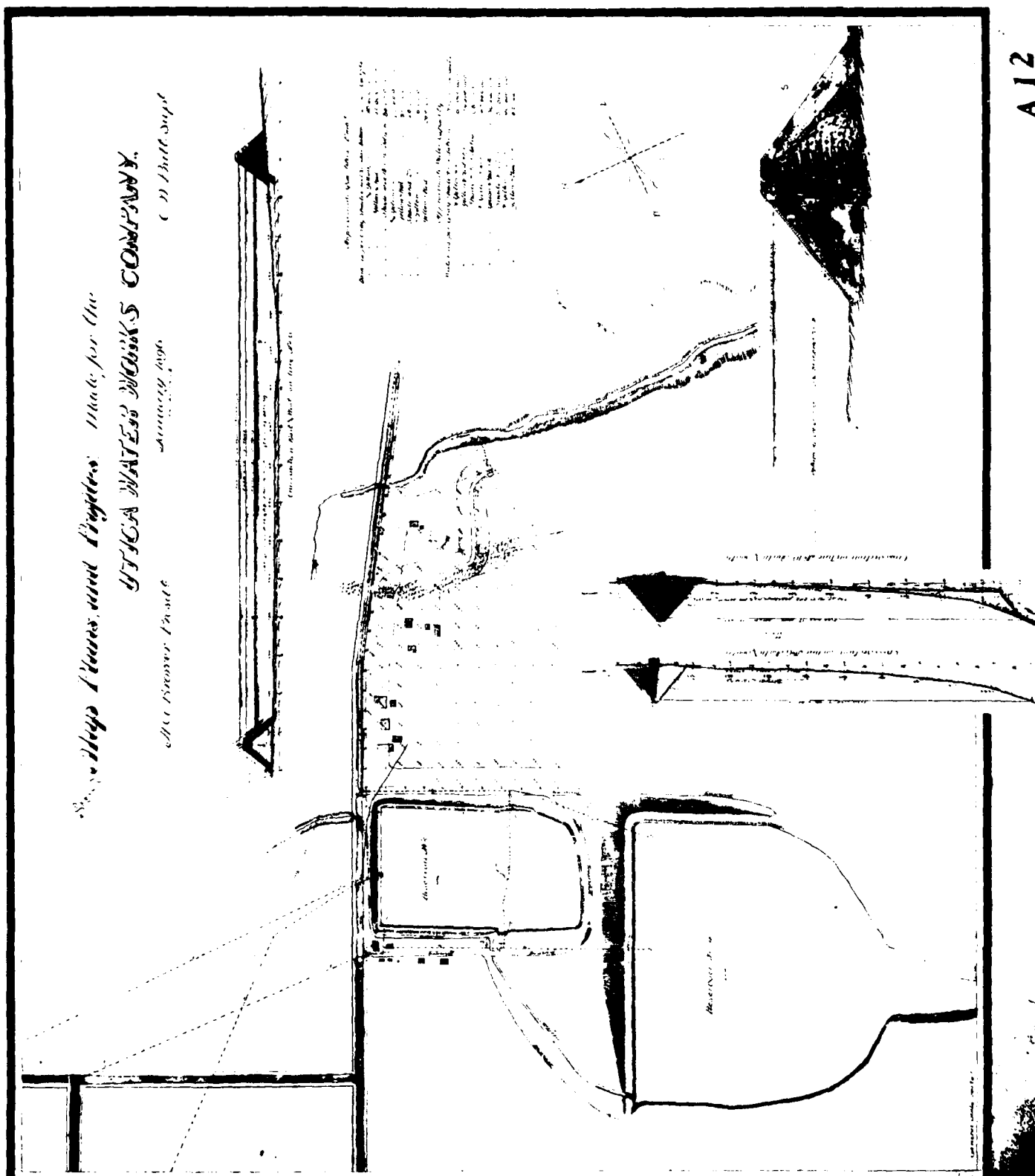
FIGURE 1

*St. Hugo Pianos and Organs: Made for the*  
**UTICA WATER WORKS COMPANY.**

( ) Bell. Suppl.

John H. Johnson

John Henry



A12

**FIGURE 2**



An aerial photograph of a landscape, possibly a coastal or island area, showing two distinct reservoirs. The image is high-contrast, with dark areas representing water or dense vegetation and lighter areas representing land or sand. The reservoirs are labeled with white text on dark backgrounds. The top reservoir is labeled 'RESERVOIR 4' and is surrounded by a dense forest. The bottom reservoir is labeled 'RESERVOIR 2' and is also surrounded by dense vegetation. A road or path runs along the right side of the image, separating the two reservoirs. The overall image has a grainy, high-contrast quality typical of older aerial photography.

RESERVOIR 4

RESERVOIR 2

APPENDIX A

FIELD INSPECTION REPORT

**CHECK LIST**  
**VISUAL INSPECTION**

**PHASE 1**

Name Dam Utica Reservoir #5 County Oneida State New York ID # NY 199  
 Type of Dam Earthen Hazard Category High  
 Date(s) Inspection July 23, 1980 Weather Cloudy Temperature 80's

Pool Elevation at Time of Inspection 6" above outlet invert M.S.L. Tailwater at Time of Inspection N/A

**Inspection Personnel:**

<u>F.W. Byszewski, P.E.</u>	<u>Dale Engineering Company</u>
<u>D.F. McCarthy, P.E.</u>	<u>Dale Engineering Company</u>
<u>H. Muskatt</u>	<u>Dale Engineering Company</u>
<u>J.A. Gomez, P.E.</u>	<u>Dale Engineering Company</u>
<u>R.S. LoGalbo, P.E.</u>	<u>Utica Board of Water Supply</u>

J. A. Gomez Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL & HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAGE OF RECORDER	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE OBSERVED	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE OBSERVED	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Numerous animal holes in embankment, both on crest and downstream slope. A few holes on impoundment side.	Some erosion south side of bank along impoundment. Small soft spot on northeast side. Small hole edge of crest northeast
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	No anomalies observed.	Some animal holes in berms. Some muskrat holes on impoundment side just above water north side. West side 1 more than 1/2 down slope, good side.
RIPRAP FAILURES	Rip Rap shows some lack of maintenance. Small areas where a little erosion of bank occurred due to lack of rip rap.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	OK	
ANY NOTICEABLE SEEPAGE	NONE OBSERVED	
STAFF GAGE AND RECORDER	NONE	
DRAINS	See plans. Valves located in field.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	N/A	Flow discharges through 20" pipe at southeast corner.
APPROACH CHANNEL	IMPOUNDMENT	
DISCHARGE CHANNEL	Small ditch east of Reservoir.	
BRIDGE AND PIERS	NONE	
		Diversion ditch south of reservoir to collect run-off from hillside. Appears unmaintained. Brush, debris in ditch.



GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	NONE	
APPROACH CHANNEL	NONE	
DISCHARGE CHANNEL	NONE	
BRIDGE AND PIERS	NONE	
GATES AND OPERATION EQUIPMENT	NONE	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	N/A	
INTAKE STRUCTURE	N/A	
OUTLET STRUCTURE	N/A	
OUTLET CHANNEL	N/A	
EMERGENCY GATE	N/A	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Underground conduit. Repairs being made approximately 150 ft. from reservoir.	
SLOPES	N/A	
APPROXIMATE NO. OF HOMES AND POPULATION	Heavily developed residential area.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	NONE	
OBSERVATION WELLS	NONE	
WEIRS	NONE	
PIEZOMETERS	NONE	
OTHER	NONE	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	SEE PLANS.	
SEDIMENTATION	NOT OBSERVED.	

**CHECK LIST**  
**ENGINEERING DATA**

**DESIGN, CONSTRUCTION, OPERATION**  
**PHASE 1**

**NAME OF DAM** Utica Reservoir 5

**ID #** NY 199

ITEM	REMARKS
AS-BUILT DRAWINGS	NONE
REGIONAL VICINITY MAP	SEE REPORT, U.S.G.S. Map
CONSTRUCTION HISTORY	NOT AVAILABLE
TYPICAL SECTIONS OF DAM	SEE REPORT
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	NO DATA AVAILABLE
RAINFALL/RESERVOIR RECORDS	NOT DATA AVAILABLE

ITEM	REMARKS
DESIGN REPORTS	NO DATA AVAILABLE
GEOLOGY REPORTS	NO DATA AVAILABLE
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	NO DATA AVAILABLE
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	NO DATA AVAILABLE
POST-CONSTRUCTION SURVEYS OF DAM	NO DATA AVAILABLE
BORROW SOURCES	NO DATA AVAILABLE

ITEM	REMARKS
MONITORING SYSTEMS	NO DATA AVAILABLE
MODIFICATIONS	NO DATA AVAILABLE
HIGH POOL RECORDS	NO DATA AVAILABLE
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	NO DATA AVAILA BLE
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	NONE REPORTED
MAINTENANCE OPERATION RECORDS	NO DATA AVAILABLE



ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	NO DATA AVAILABLE
OPERATING EQUIPMENT PLANS & DETAILS	NO DATA AVAILABLE

CHECK LIST  
HYDROLOGIC & HYDRAULIC  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 36.5 AC

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 618.5

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N/A

ELEVATION MAXIMUM DESIGN POOL: N/A

ELEVATION TOP DAM: 621.0

CREST:

a. Elevation N/A

b. Type N/A

c. Width N/A

d. Length N/A

e. Location Spillover N/A

f. Number and Type of Gates N/A

OUTLET WORKS:

a. Type 20 inch pipe

b. Location Southeast corner of reservoir

c. Entrance Inverts 618.6 $\pm$

d. Exit Inverts 598  $\pm$

e. Emergency Draindown Facilities 12 inch valved pipe.

HYDROMETEOROLOGICAL GAGES:

a. Type NONE

b. Location NONE

c. Records NONE

MAXIMUM NON-DAMAGING DISCHARGE: NO DATA AVAILABLE

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

502<sup>n</sup> Moh

Form 1 (1917) 6-15-18 1000 (10-1-18)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK  
CONSERVATION COMMISSION  
ALBANY

Sheet 128 a DAM REPORT

August 6, 1917  
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Reservoir No 5 City of Utica Dam.

This dam is situated upon the Ballou Creek  
in the City of Utica, Oneida County,  
about (State distance) from the Village or City of \_\_\_\_\_.

The distance (Up or down) stream from the dam, to the (Name of nearest important stream or of a bridge) is about (State distance) \_\_\_\_\_.

The dam is now owned by Consolidated Water Co. Utica N.Y.  
and was built in or about the year 1890, and was extensively repaired or reconstructed during the year \_\_\_\_\_.

Reservoir is surrounded by earth embankment on two sides  
As it now stands, the spillway portion of this dam is built of \_\_\_\_\_ (State whether of \_\_\_\_\_ or timber)  
and the other portions are built of Slopes of Reservoir are faced with stone on inside (State whether of \_\_\_\_\_ or timber with or without facing)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is \_\_\_\_\_ and under the remaining portions such foundation bed is \_\_\_\_\_.

Soil in neighborhood is loam with clay base.

*Reservoir is square 1000ft each side*

The total length of this dam is ..... feet. The spillway or waste-weir portion is about ..... feet long, and the crest of the spillway is about ..... feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: *Water is drawn to reservoir No 2 by a 12 inch pipe.*

State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

*This reservoir is in excellent condition.*

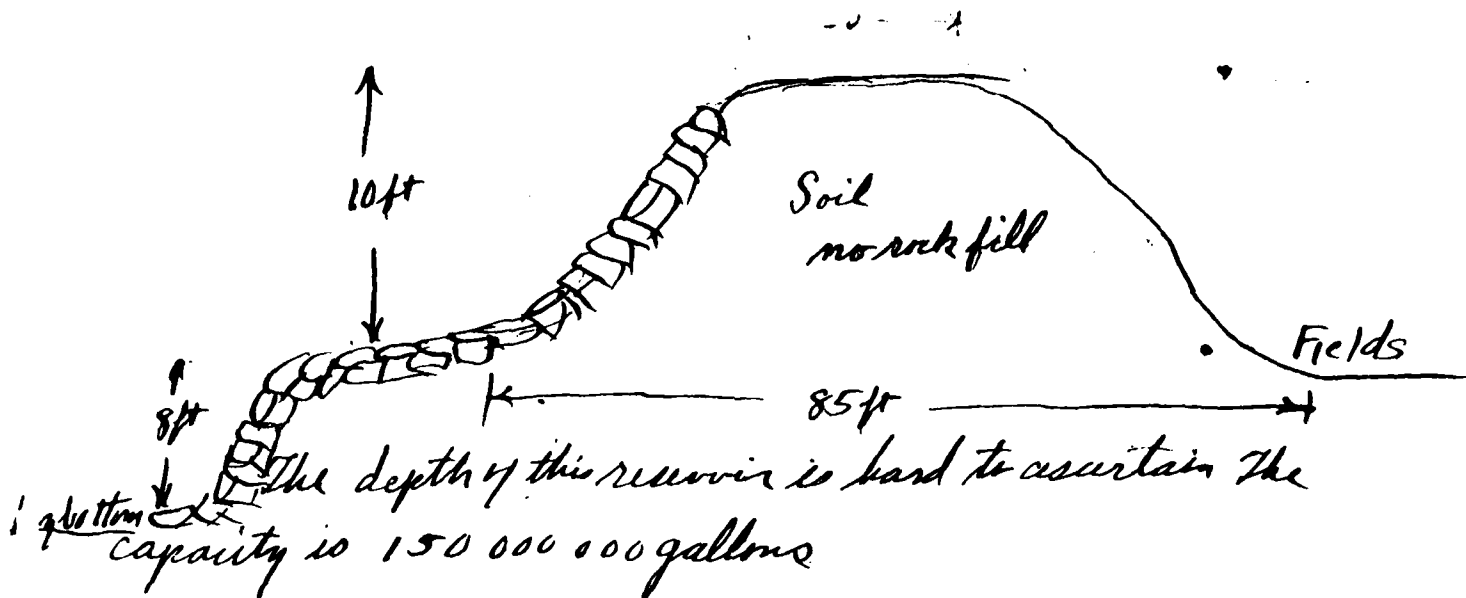
Reported by *Willard B. L. Ford*  
(Signature)

*Conservation Commission, Albany, N. Y.*  
(Address - Street and number, P. O. Box or R. F. D. route)

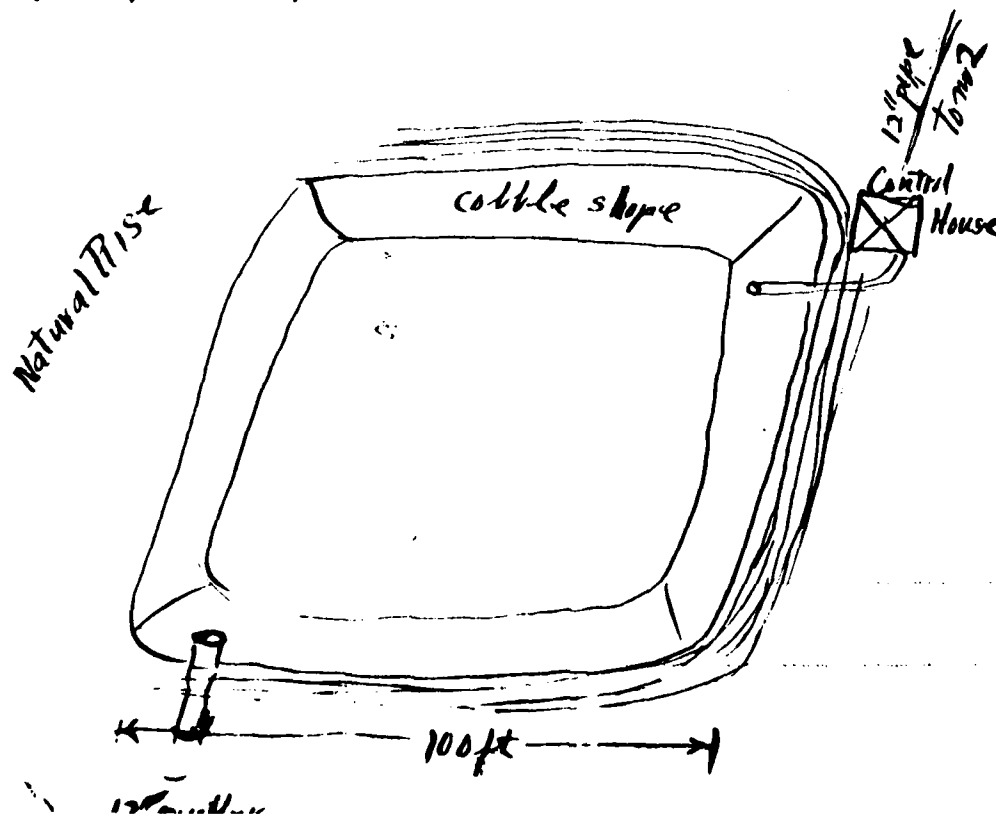
*Frankfort, N. Y.*  
(Name of place)

(SEE OTHER SIDE)

(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)



(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



STETSON • DALE

DATE  
8-8-80

JOB  
2399

DRAWN  
D.M.E.

APP'D

DRAINAGE  
AREA



**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME N.Y.S. Dam Inspections - 1980 DATE \_\_\_\_\_  
SUBJECT Utica Reservoir #5 PROJECT NO. \_\_\_\_\_  
Depth-Area-Duration DRAWN BY \_\_\_\_\_

FMP - from HMR #33

for Lat.  $\approx 43^{\circ}4'$  Long.  $\approx 75^{\circ}15'$   
Index Rainfall = 19.2" for 200 mi<sup>2</sup>, 24 hr.

<u>Duration</u>	<u>% Index</u> *	<u>Depth</u>
6 hrs	111	21.3"
12 hrs	123	23.6
24 hrs	133	25.5
48 hrs	142	27.3

\* Adjusted for area (these are adjusted for 10 mi<sup>2</sup>, the lower limit of the areal adjustment graph)



STETSON • DALE

BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800

## DESIGN BRIEF

PROJECT NAME

N.Y.S. Jan. Inspections

DATE

SUBJECT

Little Reservoir #5

PROJECT NO.

DRAWN BY

Drainage area = 36.5 ac = 0.057 mi<sup>2</sup>  
Reservoir area = 23 ac = 0.036 mi<sup>2</sup>

### Snyder Parameters

$$L = 0.256 \text{ mi} \quad L_{CA} = 0.104 \text{ mi}$$
$$(L \times L_{CA})^{0.3} = 0.337$$

$$C_t = 2.0 \text{ (assumed)}$$
$$t_p = C_t (L \times L_{CA})^{0.3} = 0.67 \text{ hr.}$$

$$C_p = 0.625 \text{ (assumed)}$$

**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME N.Y.S. Dam Inspections - 1780 DATE \_\_\_\_\_  
SUBJECT Utica Reservoir #5 PROJECT NO. \_\_\_\_\_  
DRAWN BY \_\_\_\_\_

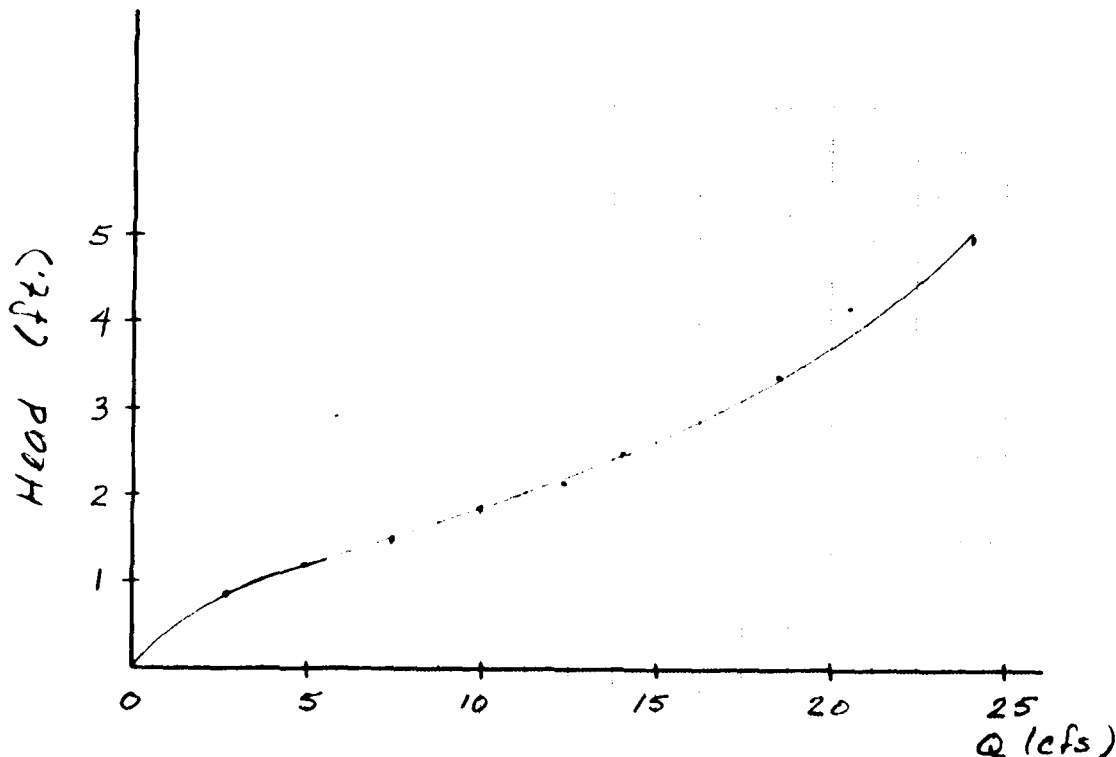
Discharge Rating - Spillway Outlet Pipe

20"  $\phi$  clay pipe with 2.5' from invert  
to low point of embankment

Assume inlet control

From Fig. B-8 "Design of Small Dams", case 3

<u>H</u>	<u>H/D</u>	<u>Q (cfs)</u>
.83'	0.5	2.7
1.17'	0.7	4.9
1.5'	0.9	7.5
1.83	1.1	10
2.17	1.3	12.3
2.5	1.5	14
3.33	2.0	18.5
4.17	2.5	20.5
5'	3.0	24





\*\*\*\*\*  
 UNIT HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 20 FEB 79  
 \*\*\*\*\*

FOR DATE/PERIOD AUG 1967  
 TIME 17:55:4

OTIC- RESERVOIR NO. 5 NY. NO. 199  
 REC-104 (SNYDER PARAMETERS)  
 FOR DAM OVER TOPPING ANALYSIS

JOB SPECIFICATION									
NO	SR	MIN	DAY	IHR	I-MIN	METEC	IFLT	IFRT	ASTAN
200	0	15	0	0	0	0	0	4	0
			J-PR	NWT	LNFT	TRACE			
			5	1	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED

PTICS= 1.30 0.50 0.60 0.80 1.00  
 NPLANE 1 NPLT= 5 LRTIME 1

\*\*\*\*\* \*\*\*\*\* \*\*\*\*\* \*\*\*\*\*

SUB-AREA RUNOFF COMPUTATION

RUNOFF COMPUTATION

ISTAG	ICOMP	IECON	ITAB	JFLT	JEST	INAME	ISTAGE	IUTG
1	0	1	0	0	0	1	0	0

HYDROGRAPH DATA

INVC	IUPG	TAREA	SNAP	TRSDA	TRSEC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.06	0.06	0.06	0.06	0.000	0	1	0

PRECIP DATA

SPR	PMS	R1	R12	R24	R48	R72	R96
0.00	17.20	111.00	123.00	132.00	142.00	0.00	0.00

TRNSC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LMPT	STPKR	ELTKR	RTIOL	LRAIN	STNKS	RTIOL	STIOL	CASTL	ALSMX	RTIOL
1	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.0

UNIT HYDROGRAPH DATA

TF= 0.67 CPE=0.63 NTA= 0

RECESSION DATA

STPTG= -2.00 GRCSW= -0.10 RTIME= 1.00

UNIT HYDROGRAPH IS EMPLOYED PERIOD ADJUSTED, DATE 0.67 HOURS, CPE = 0.62 VOL = 1.0  
 2. 25. 13. 5. 4. 2.  
 1. 1. 1. 1. 1. 1.

NO. DA PR. N PERIOD RAIN EXCS LOSS COMPT NO. DA HR. MA PERIOD RAIN EXCS LOSS COMPT G  
 SUB 21.81 20.23 1.58 3104.  
 (554.0) (514.0) (40.0) (85.59)

\*\*\*\*\*  
 \*\*\*\*\*  
 \*\*\*\*\*

HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR #3

ISTAN	ICOMP	IECON	ITAGE	JPLT	JFRT	IN-VE	ISTAGE	I UTC
1.0	1	1	0	0	0	1	0	0
QLOSS	CLOSS	AVG	IRIS	ISAVE	IOFT	IPMP	LSTR	
0.0	0.000	0.00	1	1	0	0	0	
ASIPS	NSIPR	LAS	ANSEK	K	TSK	STLR	ISFRAT	
1	1	0.00	0.00	0.00	0.00	-019.	-1	
619.30	619.07	620.0	420.30	620.67	621.00	21.83	622.67	
620.0	4.00	7.5	10.10	12.30	14.00	1.50	20.5	
12.	25.	35.	46.	58.	70.	82.		
619.	620.	620.	621.	621.	622.	622.		
COSL	SPWD	COSL	EXFL	ELEV	COSL	CAREA	EXPL	
619.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

DAM DATA  
 TUFEL CUGD EXFD DAMPID  
 621.0 2.0 1.5 200.

- PEAK OUTFLOW IS 4. AT TIME 48.25 HOURS
- PEAK OUTFLOW IS 5. AT TIME 47.00 HOURS
- PEAK OUTFLOW IS 7. AT TIME 46.25 HOURS
- PEAK OUTFLOW IS 10. AT TIME 45.75 HOURS
- PEAK OUTFLOW IS 15. AT TIME 45.75 HOURS

\*\*\*\*\*

FLOW FL. AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-PATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

		RATIOS APPLIED TO FLOWS			
ST. NO.	PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4
1	1	0.5	0.5	0.6	0.8
2	1	0.5	0.5	0.6	0.8
3	1	0.5	0.5	0.6	0.8
4	1	0.5	0.5	0.6	0.8
5	1	0.5	0.5	0.6	0.8
6	1	0.5	0.5	0.6	0.8
7	1	0.5	0.5	0.6	0.8
8	1	0.5	0.5	0.6	0.8
9	1	0.5	0.5	0.6	0.8
10	1	0.5	0.5	0.6	0.8
11	1	0.5	0.5	0.6	0.8
12	1	0.5	0.5	0.6	0.8
13	1	0.5	0.5	0.6	0.8
14	1	0.5	0.5	0.6	0.8
15	1	0.5	0.5	0.6	0.8
16	1	0.5	0.5	0.6	0.8
17	1	0.5	0.5	0.6	0.8
18	1	0.5	0.5	0.6	0.8
19	1	0.5	0.5	0.6	0.8
20	1	0.5	0.5	0.6	0.8
21	1	0.5	0.5	0.6	0.8
22	1	0.5	0.5	0.6	0.8
23	1	0.5	0.5	0.6	0.8
24	1	0.5	0.5	0.6	0.8
25	1	0.5	0.5	0.6	0.8
26	1	0.5	0.5	0.6	0.8
27	1	0.5	0.5	0.6	0.8
28	1	0.5	0.5	0.6	0.8
29	1	0.5	0.5	0.6	0.8
30	1	0.5	0.5	0.6	0.8
31	1	0.5	0.5	0.6	0.8
32	1	0.5	0.5	0.6	0.8
33	1	0.5	0.5	0.6	0.8
34	1	0.5	0.5	0.6	0.8
35	1	0.5	0.5	0.6	0.8
36	1	0.5	0.5	0.6	0.8
37	1	0.5	0.5	0.6	0.8
38	1	0.5	0.5	0.6	0.8
39	1	0.5	0.5	0.6	0.8
40	1	0.5	0.5	0.6	0.8
41	1	0.5	0.5	0.6	0.8
42	1	0.5	0.5	0.6	0.8
43	1	0.5	0.5	0.6	0.8
44	1	0.5	0.5	0.6	0.8
45	1	0.5	0.5	0.6	0.8
46	1	0.5	0.5	0.6	0.8
47	1	0.5	0.5	0.6	0.8
48	1	0.5	0.5	0.6	0.8
49	1	0.5	0.5	0.6	0.8
50	1	0.5	0.5	0.6	0.8
51	1	0.5	0.5	0.6	0.8
52	1	0.5	0.5	0.6	0.8
53	1	0.5	0.5	0.6	0.8
54	1	0.5	0.5	0.6	0.8
55	1	0.5	0.5	0.6	0.8
56	1	0.5	0.5	0.6	0.8
57	1	0.5	0.5	0.6	0.8
58	1	0.5	0.5	0.6	0.8
59	1	0.5	0.5	0.6	0.8
60	1	0.5	0.5	0.6	0.8
61	1	0.5	0.5	0.6	0.8
62	1	0.5	0.5	0.6	0.8
63	1	0.5	0.5	0.6	0.8
64	1	0.5	0.5	0.6	0.8
65	1	0.5	0.5	0.6	0.8
66	1	0.5	0.5	0.6	0.8
67	1	0.5	0.5	0.6	0.8
68	1	0.5	0.5	0.6	0.8
69	1	0.5	0.5	0.6	0.8
70	1	0.5	0.5	0.6	0.8
71	1	0.5	0.5	0.6	0.8
72	1	0.5	0.5	0.6	0.8
73	1	0.5	0.5	0.6	0.8
74	1	0.5	0.5	0.6	0.8
75	1	0.5	0.5	0.6	0.8
76	1	0.5	0.5	0.6	0.8
77	1	0.5	0.5	0.6	0.8
78	1	0.5	0.5	0.6	0.8
79	1	0.5	0.5	0.6	0.8
80	1	0.5	0.5	0.6	0.8
81	1	0.5	0.5	0.6	0.8
82	1	0.5	0.5	0.6	0.8
83	1	0.5	0.5	0.6	0.8
84	1	0.5	0.5	0.6	0.8
85	1	0.5	0.5	0.6	0.8
86	1	0.5	0.5	0.6	0.8
87	1	0.5	0.5	0.6	0.8
88	1	0.5	0.5	0.6	0.8
89	1	0.5	0.5	0.6	0.8
90	1	0.5	0.5	0.6	0.8
91	1	0.5	0.5	0.6	0.8
92	1	0.5	0.5	0.6	0.8
93	1	0.5	0.5	0.6	0.8
94	1	0.5	0.5	0.6	0.8
95	1	0.5	0.5	0.6	0.8
96	1	0.5	0.5	0.6	0.8
97	1	0.5	0.5	0.6	0.8
98	1	0.5	0.5	0.6	0.8
99	1	0.5	0.5	0.6	0.8
100	1	0.5	0.5	0.6	0.8

# SUMMARY OF DAM SAFETY ANALYSIS

.....									
ELEVATION	INITIAL VALUE	SPILLWAY CREST	TIME OF DAY	MAXIMUM RESERVOIR W.S. ELEV	MAXIMUM ST. RATE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
ST. RATE OUTFLOW	613.50 0. 0.	618.50 0. 0.	621.77 58. 14.						
1.0	613.50	618.50	621.77	619.44	17.	2.	0.00	48.25	0.00
1.50	619.72	24.	5.	619.72	24.	5.	0.00	47.00	0.00
2.00	619.95	33.	7.	619.95	33.	7.	0.00	46.25	0.00
2.50	620.42	44.	10.	620.42	44.	10.	0.00	45.75	0.00
3.00	621.20	55.	13.	621.20	55.	13.	0.00	45.75	0.00



APPENDIX D

REFERENCES

## APPENDIX D

### REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976
2. U.S. Nuclear Regulatory Commission: Design Basis Floods for Nuclear Power Plants, Regulating Guide 1.59, Revision 2, August 1977
3. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)
4. W. Viessman, Jr., J. Knapp, G. Lewis, 1977, 2nd Edition, Introduction to Hydrology
5. Ven Te Chow: Handbook of Applied Hydrology, McGraw-Hill, 1964
6. The Hydrologic Engineering Center: Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package, User's Manual, Corps of Engineers, U.S. Army, 609 Second Street, Davis, California 95616, January 1973
7. The Hydrologic Engineering Center, Computer Program: Flood Hydrograph Package (HEC-1) Users Manual For Dam Safety
8. Soil Conservation Service (Engineering Division): Urban Hydrology for Small Watersheds, Technical Release No. 55, U.S. Department of Agriculture, January 1975
9. H.W. King, E.F. Brater: Handbook of Hydraulics, McGraw-Hill, 5th Edition, 1963
10. Ven Te Chow: Open Channel Hydraulics, McGraw-Hill, 1959
11. Bureau of Reclamation, United States Department of the Interior, Design of Small Dams: A Water Resources Technical Publication, Third Printing, 1965
12. J.T. Riedel, J.F. Appleby and R.W. Schloemer: Hydrometeorological Report No. 33, U.S. Department of Commerce, U.S. Department of Army, Corps of Engineers, Washington, D.C., April 1956. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.
13. North Atlantic Regional Water Resources Study Coordinating Committee: Appendix C, Climate, Meteorology and Hydrology, February 1972

14. The University of the State of New York - The State Education Department, State Museum and Science Service, Geological Survey: Geologic Map of New York, 1970
15. Y.W. Isachsen and W.G. McKendree, 1977, Preliminary Brittle Structures Map of New York, Hudson-Mohawk Sheet, New York State Museum Map and Chart Series No. 31B
16. H. L. Fairchild, 1904, Glacial Waters from Oneida to Little Falls: New York State Museum 22nd report of State Geologist.
17. H. L. Fairchild, 1912, The Glacial Waters in the Black and Mohawk Valleys: New York State Museum Bulletin 160.
18. A. P. Brigham, 1931, Glacial Problems in Central New York: Annals of the Association of American Geographers, Volume 21, No. 4.